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PREHISTORY OF THE OPEN KARST, FURTHER DISCOVERIES FROM THE GEOARCHAEOLOGICAL SURVEY OF POLJE ČEPIĆ, CROATIA

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This paper reports on the results achieved since the first systematic geoarchaeological survey of Polje Čepić in March 2004. We present here a short summary of the findings of all survey campaigns carried out around Polje Čepić, to August 2005. The reasons for the launching of the survey as well as the methods employed are shortly presented. We also discuss the impact of this project on our knowledge of the regional prehistory.

Keywords: *Open-air sites, GIS database, Mediterranean wetlands, Mesolithic, fresh water*

Open-air sites and systematic survey in Istria

Further systematic surveys of the margins of Polje Čepić were carried out since the publication of the report on the first field season (Balbo et al. 2004). A sediment sequence extracted from the polje itself was also studied and its results should soon be published (Balbo et al. in press). Our understanding of the formation and transformations of the polje environment during the Holocene is rapidly improving. Similarly, we can now better appreciate the settling preferences and choices made by prehistoric people in Istria, with further regard to understanding open-air prehistoric settlement in the wider region.

As with most other karstic regions, until recently Istria had not been systematically surveyed for open-air Mesolithic sites. In fact, most of the prehistoric stud-

ies carried out so far have been focusing on the finding and excavation of cave sites. This research bias had an important impact on generalised interpretations of the prehistoric land use and occupation strategies in the east Adriatic (Inga 2003). The systematic survey of Polje Čepić in 2004 and 2005 implemented our knowledge of the regional prehistory with the discovery of over a dozen previously unknown open-air sites, with artefacts characteristic of the Upper Palaeolithic, Mesolithic and Neolithic periods (Figure 1 and 2).



Figure 1 View over Polje Čepić and Učka Mountain from the site discovered at Ivšiće.

The survey of Polje Čepić, reasons and methods

In March 2003 we briefly assessed the potential for the recovery of open-air archaeological sites around Polje Čepić, Istria, Croatia. One of our aims was to address issues related to the frequentation and settling of this region in prehistoric times, through the recovery and the chronological and typological characterisation of as many open-air sites as possible. We wanted to know whether or not, when,

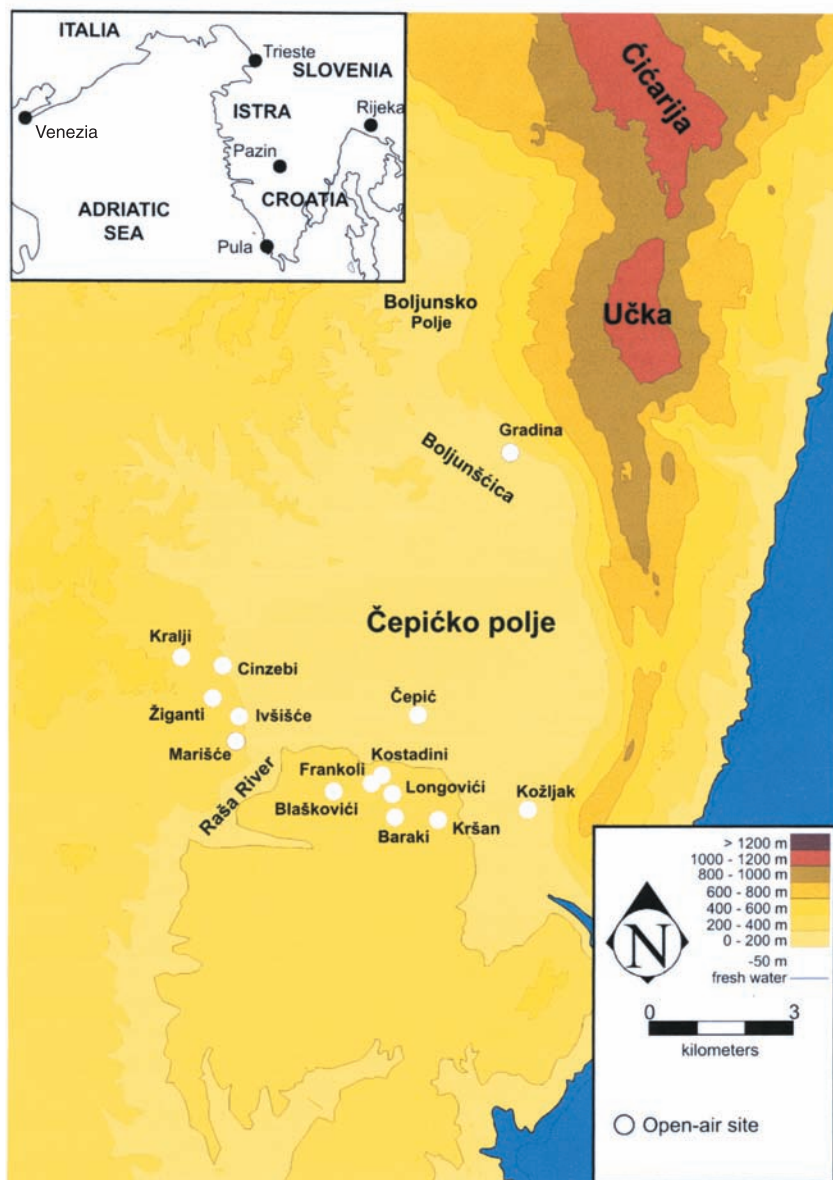


Figure 2 Topographic map of Polje Čepić showing the position of the archaeological areas discovered during the systematic survey of its margins.

and possibly why and how, the open landscapes of this part of Istria was populated previous to historical times.

The first surveyed areas were chosen based on the local topography, geology, and pedology as presented in the available technical maps. The topographical, hydrological, and pedological maps, in conjunction with aerial photos, were the most useful tools used during this phase. Terraces, river valleys, and springs could be identified on the topographical and hydrological maps. The most stable landforms, with their mature soils, where post-glacial archaeological sites were most likely to be found, were located on the pedological map. The accessibility and visibility on the ground for the areas to be surveyed were assessed based on available aerial photographs. The potentially most mature soils developed on the margins of the polje were visited for a week in July 2003 and delivered the first lithic scatter around Kostadini.

Following those results, three extensive surveys were set in 2004 and 2005,

	Weeks	Persons	Qs tot	Qs+	%
Mar 2004	1	2.5	28	6	15%
Jul-Aug 2004	5	4	96	14	21%
Apr 2005	2	3	59	17	29%
Total	8		183	37	

Archaeological Areas	N. of Qs+
Baraki	3
Blaškovici	1
Čepić	3
Cinzebi	3
Frankoli	2
Gradina	1
Ivšišće	5
Kostadini	1
Kožljak	2
Kralji	5
Kršan	2
Longovići	1
Marišće	4
Žiganti	4
Total	37

Table 1 *The number of weeks and people employed during the three systematic survey campaigns carried out in 2004 and 2005 around Polje Čepić. The last column shows the steady increase in the discovery of positive fields (Q+).*

Table 2 *The 14 archaeological areas in which the positive fields have been grouped.*

twice in the spring, during the rainy season, and once in the summer, involving undergraduate students from English and Croatian Universities (Table 1). Out of the 183 surveyed fields (Qs), 37 were classified as positive, containing archaeological remains of pre-Roman period. In other terms, out of 670826.397 m² surveyed 119573.192 m² contained prehistoric remains. About 20% of the surveyed fields, corresponding to about 18% of the surveyed area, gave a positive result. The relative estimations in terms of fields and surface are virtually the same. This indicates the effectiveness of choosing cultivated fields as the minimal unit for the setting of the survey, overcoming the potential distorting effect of uneven visibility, without imposing any rigid grid on the surveyed area. With the aid of commercial GIS software, all surveyed fields were positioned on the top of existing digital maps. All positive surveyed fields were grouped in 14 wider archaeological areas, and named after the closest local name (Table 2 and Figure 2).

During summer 2005 further test-excavations were carried out at three of the archaeological areas discovered during the previous seasons. The steady increase in the relative number of positive fields found during successive surveys can be explained by the progressive increase in our understanding of the region and the variables influencing the distribution of archaeological scatters.

The prehistoric evidence

All lithic artefacts recovered during the survey campaigns were characterised in the field laboratory in terms of formal typology and, when possible, raw material. All finds have since been studied and entered in the database of the Archaeological Museum of Istria. For the purposes of this preliminary analysis, the assemblage was observed only macroscopically. Three general classes of stone artefacts were used, namely debitage (flakes, blades, bladelets, knapping and burned debris, small debris and flakes), cores (including core fragments), and retouched pieces (Finlayson et al. 2000; Inizan et al. 1992). We classified as retouched pieces all lithic artefacts with secondary modification, while excluding unretouched pieces with possible traces of usewear or hafting. Out of the 707 stone artefacts recovered during the surveys, 144 were classified as tools, cores, and core fragments. The most significant finds were photographed and drawn (Figure 3). As for the classification of different raw materials, three groups were made, considering the distance of the source from the Mesolithic site of Kostadini: "local" for raw materials from sources within 10 km, "regional" for those found within a ray of 10 to 50 km, and "exotic" for a raw material from sources more than 50 km from the site. Among the exotic raw

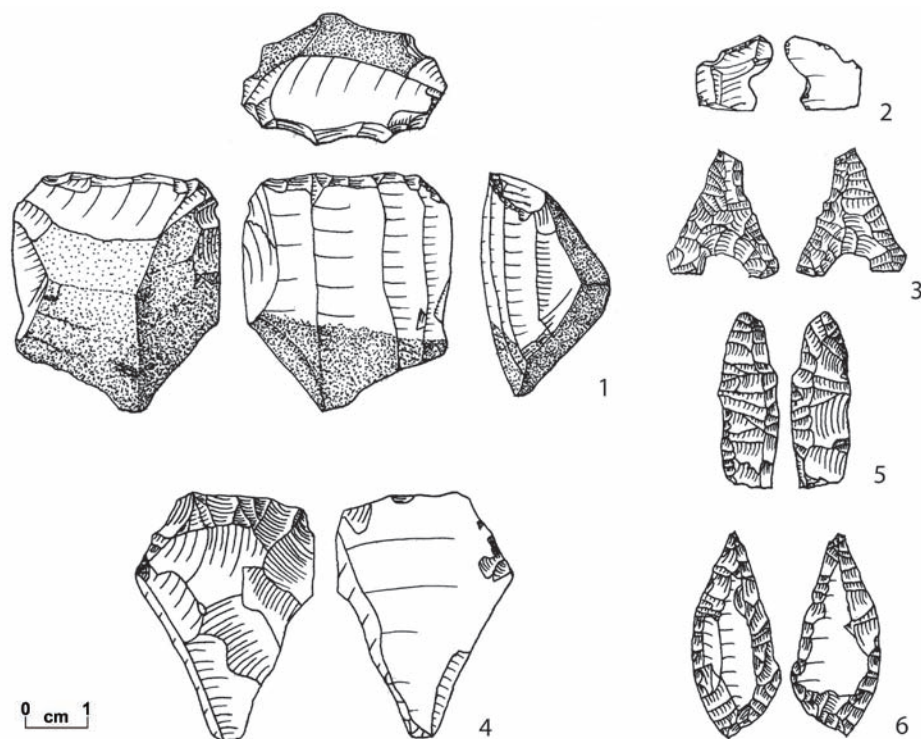


Figure 3 Some of the lithic artefacts recently discovered on the margins of Polje Čepić (1:1). Frankoli: 1. prismatic core, 2. retouched piece of obsidian, 3. bifacial arrowhead with base notch; Cinzebi 4. endscraper; Ivšiče: 5. bifacial point, 6. bifacial arrowhead on blade; (drawings by D. Komšo).

materials, a fragment of obsidian, similar to that found at Pupicina Cave (Miracle and Forenbaher 2005, Forenbaher 2006), and likewise probably extracted on Lipari Island (Lisa Beyer personal communication), was found near Frankoli in association to possibly Late Neolithic stone tools (Figure 3:2).

So far, the most extensively explored site is Kostadini, for which a relatively refined chronological and functional characterisation was possible. Using the evidence collected so far, and based on the lithic assemblage, the density and distribution of lithic artefacts found at Kostadini, we suggest that this was a Mesolithic field camp where multifunctional activities, related to the everyday life of its inhabitants, were performed (Balbo et al. in press). In connection with Kostadini another four sites on the southern and western margins of the polje were recognised as being

probably Mesolithic, although further test excavations are required in order to characterise them more precisely.

Significance of the discovered sites

Evidence of Neolithic and later prehistoric times is being compared to the palaeoclimatic and palaeoenvironmental evidence obtained from the study of sediments recovered from the polje and from neighbouring regions (Balbo et al. in press). Issues related to the early human impact on the filling of shallow karstic lakes in the last 7000 years are currently being explored.

Due to the lack of absolute-datable materials, the archaeological sites discovered so far can only be characterised by typological and raw material comparison with other locations previously studied in the region (Miracle 1997, Miracle and Forenbaher 2000, Miracle et al. 2000, Komšo and Miracle 2005). All the newly discovered Mesolithic sites are situated close to a spring or minor watercourses, not too high above the present-day base of the polje; they are always in view of the basin, and can be seen from each other. Open-air Mesolithic sites are extremely rare and poorly known along the eastern Adriatic coastline and in karstic environments in the wider region. The discovery of Mesolithic open-air sites such as Kostadini (Balbo et al. in press) are enhancing our knowledge of the Mesolithic of Istria and the eastern Adriatic region. These first systematic site discoveries are providing some guidelines on where and how to find open-air Mesolithic settlements in karstic Mediterranean regions.

As for earlier periods, a rather small lithic scatter was found at Ivšišće during the survey of Polje Čepić, and seems to point to the presence of settlers around the polje as early as the mid Upper Palaeolithic, at the peak of the last glacial age (Karavanić 2003). In fact, after our preliminary observations, this small assemblage seems to share some of the typological and raw material characteristics with the Aurignacian layers at Šandalja, on the southern tip of Istria. Further excavations are planned, and should bring new evidence for a better understanding of this site.

Final remarks

The recent discoveries of numerous open-air sites from different prehistoric times gave us new means for the solution of wider issues concerning the relations those people had with their environments. We hope that further research in the area will follow. The area should be tightly monitored in case of involvement in large infrastructural projects, as the building of new roads, factories, and pipelines.

In particular, the filling of the polje itself could bear well-preserved evidence of the way of life of its Holocene inhabitants. Open-air sites such as those discovered around Polje Čepić are essential to an improved understanding of the Prehistory of Istria and the wider region.

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SAŽETAK

PRAPOVIJESNA NASELJA NA OTVORENOM U KRAŠKOM PODRUČJU, NOVA SAZNAJNA S GEOARHEOLOŠKOG REKOGNOSCIRANJA ČEPIČKOG POLJA, HRVATSKA

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Daljnja sistematska rekognosciranja rubova Čepićkog polja nastavljena su nakon proljeća 2004. Ti su rezultati publicirani u izvještaju prve sezone istraživanja. Obavljeno je, također, bušenje geološke jezgre, čime je dobiven uzorak taložine jezera. Rezultati analiza toga uzorka uskoro će biti objavljeni. Naše razumijevanje tvorbe i pretvorbe okoliša Čepićkog polja tijekom holocena izrazito se povećalo. Sada se može s više razumijevanja odrediti kakve su pozicije prapovijesni ljudi odabirali za svoje naseobine, te ujedno dati doprinos boljem poznavanju prapovijesnih nalazišta na otvorenom u široj regiji.

Tijekom 2004. i 2005., ukupno su rekognoscirana 183 obrađena polja, odnosno 670.826,397 m², od kojih su na 37 pregledanih polja, odnosno na 119.573,192 m², zabilježeni arheološki nalazi iz razdoblja prapovijesti. Rekognoscirana polja na kojima su prikupljeni arheološki nalazi grupirano je u 14 širih arheoloških zona, koje su nazvane po lokalnom toponimu ili nazivu najbližeg naselja. Ljeti 2005. izvršena su probna istraživanja triju arheoloških zona, zabilježenih tijekom prethodnih sezona rekognosciranja.

Sav prikupljeni skup kamenih nalaza tijekom rekognosciranja i istraživanja je analiziran. Ukupno je prikupljeno 707 kamenih izradevina (jedna izradevina od opsidijana, ostalo kremen), od kojih su 144 izradevine određene kao alatke, jezgre i dijelovi jezgri.

Manji skup rasutih kamenih izradevina prikupljen je tijekom rekognosciranja okolice sela Ivšiće. Rezultati sirovinskih, tehnoloških i tipoloških analiza prikupljenih kamenih izradevina imaju sličnosti s kamenim izradevinama prikupljenim u aurignacijskim slo-

jevima pećine Šandalje II kod Pule, te ukazuju na prisutnost ljudi u okolici polja tijekom ranog gornjeg paleolitika. Planirana su daljnja istraživanja toga nalazišta, radi boljeg razumijevanja u kontekstu Čepićkog polja kao i u kontekstu šire regije.

Dosad je najviše materijala prikupljeno na nalazištu Kostadini, što je omogućilo relativno precizno određenje njegovih kronoloških i funkcionalnih karakteristika nalazišta. Pretpostavljamo kako je ovo nalazište imalo funkciju baznog kampa tijekom razdoblja mezolitika, u kojem su se obavljale raznovrsne aktivnosti posvećene lovu i pretvorbenim aktivnostima. Osim Kostadini, još 5 otvorenih nalazišta, smještenih na južnim i zapadnim rubovima polja određena su u razdoblje mezolitika, no zbog malobrojnoga prikupljenog arheološkog materijala, potrebna su daljnja istraživanja radi njihovog boljeg razumijevanja. Sva su ta nalazišta smještena u blizini izvora ili manjih potoka, ne odveć visoko iznad današnje površine polja, s dobrim pregledom polja i međusobno vidljiva.

Osim nalazišta iz navedenih razdoblja, prikupljeni su i skupovi kamenih nalaza na više nalazišta na otvorenom, datiranih u razdoblja od neolitika do brončanog doba. Od prikupljenog arheološkog materijala potrebno je istaknuti nalaze izrađevine od opsidijana i bifacijalne kremene strelice iz Frankoli, bifacijalnu kremenu strelicu iz Ivšića te grebalo iz Cinzebi.

Sistematska geoarheološka rekognosciranja Čepićkog polja, tijekom kojih je zabilježeno 14 dotad nepoznatih nalazišta na otvorenom, s prikupljenim arheološkim materijalom iz razdoblja paleolitika, mezolitika, neolitika, bakrenog i brončanog doba povećala su naša saznanja o prapovijesti šire regije.